

Attorney Docket No. 3882/8
App. No. 09/815,557

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (original) A method for improving diagnosis of a complex problem, wherein a plurality of indicators expected to relate to the problem are correlated over a window of time, the window of time comprising a plurality of time slices in each of which a state of each indicator is determined, the method comprising:

determining which indicator or indicators changed state during a first time slice in the window and which indicator or indicators did not change state during the first time slice;

computing a time slice transition factor based upon a number of indicators whose state changed and a number of indicators whose state did not change during the first time slice;
and

adjusting the correlation of the indicators over the window of time using the time slice transition factor.

2. (original) The method of claim 1, wherein determining state changes in each of the indicators comprises determining the state changes of each indicator in each of a plurality of time slices in the window.

3. (original) The method of claim 2, wherein computing a time slice transition factor comprises computing a plurality of time slice transition factors, and wherein adjusting the correlation of the indicators comprises adjusting the correlation using the plurality of time slice transition factors.

Attorney Docket No. 3882/8
App. No. 09/815,557

4. (original) The method of claim 1, wherein determining state changes comprises comparing the state of each of the indicators in the first time slice with the state of the respective indicator in a second time slice preceding the first time slice.

5. (original) The method of claim 4, wherein the second time slice immediately precedes the first time slice.

6. (original) The method of claim 1, wherein indicators have a plurality of possible states including a low state and a high state, and wherein determining state changes in the indicators in the first time slice comprises determining which indicator or indicators changed state from low to high and which indicator or indicators changed state from high to low.

7. (original) The method of claim 6, wherein computing the time slice transition factor comprises computing the transition factor further based upon a number of indicators whose state changed from low to high and a number of indicators whose state changed from high to low.

8. (original) The method of claim 7, wherein computing the time slice transition factor comprises identifying a maximum among the number of indicators whose state did not change, the number of indicators whose state changed from low to high, and the number of indicators whose state changed from high to low, and dividing the maximum by the number of indicators.

9. (original) The method of claim 1, wherein indicators are correlated based on the states of the indicators in each time slice, and wherein adjusting the correlation comprises applying the time slice transition factor to the correlation for the first time slice.

10. (original) The method of claim 1, wherein the indicators are grouped into two or more groups of indicators, and wherein computing the time slice transition factor comprises

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computing a time slice transition factor for each group based upon the numbers of indicators in each group whose state changed or did not change during the time slice.

11. (original) The method of claim 1, wherein determining indicator state changes comprises adjusting the first time slice to account for potential delays in determining states of the indicators.

12. (original) The method of claim 11, wherein adjusting the first time slice to account for potential delays comprises:

determining which indicator, if any, changed state last in time during the first time slice;

determining whether any other indicators changed state during a predefined period preceding the time of last indicator state change; and

considering such other indicators whose state changed during the predefined period as having occurred during the first time slice.

13. (original) The method of claim 1, comprising storing a transition relevance factor in association with each indicator representing whether the indicator is relevant, and wherein determining state changes comprises determining the changes only for relevant indicators.

14. (original) In a system for analyzing faults in devices by correlating a plurality of indicators over a window of time and generating alarms based upon the correlation, the window of time comprising a plurality of time slices in each of which a state of each indicator is probed, a method for reducing false alarms comprising:

determining which of the indicators changed state in similar fashion during a first time slice in the window or did not change state during the first time slice;

Attorney Docket No. 3882/8
App. No. 09/815,537

computing a time slice transition factor that relates a number of the indicators whose state changed in similar fashion or did not change during the first time slice to a total number of the indicators; and

adjusting the correlation of the indicators over the window of time using the time slice transition factor.

15. (original) A computer readable medium storing program code which, when executed, causes a computer to perform a method for reducing false alarms in a system for analyzing problems by correlating a plurality of indicators over a window of time and generating alarms based upon the correlation, the window of time comprising a plurality of time slices in each of which a state of each indicator is probed, the method comprising:

determining which of the indicators changed state in similar fashion during a first time slice in the window or did not change state during the first time slice;

computing a time slice transition factor that relates a number of the indicators whose state changed in similar fashion or did not change during the first time slice to a total number of the indicators; and

adjusting the correlation of the indicators over the window of time using the time slice transition factor.

16. (original) The computer readable medium of claim 15 wherein the method performed by the program comprises determining the state changes of each indicator in each of a plurality of time slices in the window.

17. (original) The computer readable medium of claim 16 wherein the method performed by the program comprises computing a plurality of time slice transition factors and adjusting the correlation using the plurality of time slice transition factors.

18. (original) The computer readable medium of claim 15, wherein indicators have a plurality of possible states including a low state and a high state, and wherein the method performed by the program comprises determining which indicator or indicators changed state from low to high and which indicator or indicators changed state from high to low.

19. (original) The computer readable medium of claim 18 wherein the method performed by the program comprises computing the transition factor further based upon a number of indicators whose state changed from low to high and a number of indicators whose state changed from high to low.

20. (original) The computer readable medium of claim 15 wherein the method performed by the program comprises computing the time slice transition factor by identifying a maximum among the number of indicators whose state did not change, the number of indicators whose state changed from low to high, and the number of indicators whose state changed from high to low, and dividing the maximum by the number of indicators.

21. (original) The computer readable medium of claim 15, wherein the indicators are grouped into two or more groups of indicators, and wherein the method performed by the program comprises computing a time slice transition factor for each group based upon the numbers of indicators in each group whose state changed or did not change during the time slice.

22. (original) The computer readable medium of claim 15, wherein a transition relevance factor is stored in association with each indicator representing whether the indicator is relevant, and wherein the method performed by the program comprises determining state changes only for relevant indicators.

23. (canceled)

24. (canceled)

25. (original) A method for correlating a number of indicators in a rules-based correlation system, wherein a plurality of indicators each having multiple possible values and expected to relate to a problem are correlated over a window of time, the method comprising:

- dividing the window of time into a plurality of time slices;
- determining a value for each indicator during each of a plurality of the time slices;
- determining a transition state for each indicator during each of the plurality of time slices, the transition state representing whether and how the indicator changed state during the time slice; and
- correlating the indicators over the window of time based upon the determined indicator values and transitions states.

26. (new) The method of claim 25, wherein determining state changes comprises comparing the state of each of the indicators in a first time slice in the plurality of time slices with the state of the respective indicator in a second time slice in the plurality of time slices preceding the first time slice.

27. (new) The method of claim 26, wherein the second time slice immediately precedes the first time slice.

28. (new) The method of claim 25, wherein the transition state for each indicator is a plurality of possible states including a low state and a high state, and wherein determining the transition state for the indicators in a first time slice in the plurality of time slices comprises determining which indicator or indicators changed state from low to high and which indicator or indicators changed state from high to low.

29. (new) The method of claim 28, wherein determining the transition state is further based upon a number of indicators whose state changed from low to high and a number of indicators whose state changed from high to low.

30. (new) The method of claim 29, wherein determining the transition state comprises identifying a maximum among the number of indicators whose state did not change, the number of indicators whose state changed from low to high, and the number of indicators whose state changed from high to low, and dividing the maximum by the number of indicators.

31. (new) The method of claim 25, wherein the indicators are grouped into two or more groups of indicators, and wherein determining the transition state for each indicator comprises determining the transition state for each group based upon the numbers of indicators in each group whose state changed or did not change during each of the plurality of time slices.

32. (new) The method of claim 25, wherein determining a transition state for each indicator comprises adjusting a first time slice to account for potential delays in determining states of each indicator.

33. (new) The method of claim 32, wherein adjusting the first time slice to account for potential delays comprises:

determining which indicator, if any, changed state last in time during the first time slice;

determining whether any other indicators changed state during a predefined period preceding the time of last indicator state change; and

considering such other indicators whose state changed during the predefined period as having occurred during the first time slice.

34. (new) The method of claim 25, comprising storing a transition relevance factor in association with each indicator representing whether the indicator is relevant, and wherein determining a transition state for each indicator comprises determining transition state changes only for relevant indicators.

35. (new) The system of claim 14, wherein determining state changes in each of the indicators comprises determining the state changes of each indicator in each of a plurality of time slices in the window.

36. (new) The system of claim 35, wherein computing a time slice transition factor comprises computing a plurality of time slice transition factors, and wherein adjusting the correlation of the indicators comprises adjusting the correlation using the plurality of time slice transition factors.

37. (new) The system of claim 14, wherein determining state changes comprises comparing the state of each of the indicators in the first time slice with the state of the respective indicator in a second time slice preceding the first time slice.

38. (new) The system of claim 37, wherein the second time slice immediately precedes the first time slice.

39. (new) The system of claim 14, wherein indicators have a plurality of possible states including a low state and a high state, and wherein determining state changes in the indicators in the first time slice comprises determining which indicator or indicators changed state from low to high and which indicator or indicators changed state from high to low.

40. (new) The system of claim 39, wherein computing the time slice transition factor comprises computing the transition factor further based upon a number of indicators

Attorney Docket No. 3882/8
App. No. 09/815,557

whose state changed from low to high and a number of indicators whose state changed from high to low.

41. (new) The system of claim 40, wherein computing the time slice transition factor comprises identifying a maximum among the number of indicators whose state did not change, the number of indicators whose state changed from low to high, and the number of indicators whose state changed from high to low, and dividing the maximum by the number of indicators.

42. (new) The system of claim 14, wherein indicators are correlated based on the states of the indicators in each time slice, and wherein adjusting the correlation comprises applying the time slice transition factor to the correlation for the first time slice.

43. (new) The system of claim 14, wherein the indicators are grouped into two or more groups of indicators, and wherein computing the time slice transition factor comprises computing a time slice transition factor for each group based upon the numbers of indicators in each group whose state changed or did not change during the time slice.

44. (new) The system of claim 14, wherein determining indicator state changes comprises adjusting the first time slice to account for potential delays in determining states of the indicators.

45. (new) The system of claim 44, wherein adjusting the first time slice to account for potential delays comprises:

determining which indicator, if any, changed state last in time during the first time slice;

determining whether any other indicators changed state during a predefined period preceding the time of last indicator state change; and

considering such other indicators whose state changed during the predefined period as having occurred during the first time slice.

46. (new) The system of claim 14, comprising storing a transition relevance factor in association with each indicator representing whether the indicator is relevant, and wherein determining state changes comprises determining the changes only for relevant indicators.

47. (new) The computer readable medium of claim 15, wherein the method performed by the program to determine state changes comprises comparing the state of each of the indicators in the first time slice with the state of the respective indicator in a second time slice preceding the first time slice.

48. (new) The computer readable medium of claim 47, wherein the second time slice immediately precedes the first time slice.

49. (new) The computer readable medium of claim 15, wherein the method performed by the program comprises correlating indicators based on the states of the indicators in each time slice, and wherein the method performed by the program for adjusting the correlation comprises applying the time slice transition factor to the correlation for the first time slice.

50. (new) The computer readable medium of claim 15, wherein the method performed by the program for determining indicator state changes comprises adjusting the first time slice to account for potential delays in determining states of the indicators.

51. (new) The computer readable medium of claim 50, wherein the method performed by the program for adjusting the first time slice to account for potential delays comprises:

Attorney Docket No. 3882/8
App. No. 09/815,557

determining which indicator, if any, changed state last in time during the first time slice;

determining whether any other indicators changed state during a predefined period preceding the time of last indicator state change; and

considering such other indicators whose state changed during the predefined period as having occurred during the first time slice.

52. (new) A computer readable medium storing program code which, when executed, causes a computer to perform a method for correlating a number of indicators in a rules-based correlation system, wherein a plurality of indicators each having multiple possible values and expected to relate to a problem are correlated over a window of time, the method comprising:

dividing the window of time into a plurality of time slices;

determining a value for each indicator during each of a plurality of the time slices;

determining a transition state for each indicator during each of the plurality of time slices, the transition state representing whether and how the indicator changed state during the time slice; and

correlating the indicators over the window of time based upon the determined indicator values and transitions states.

53. (new) The computer readable medium of claim 52, wherein determining state changes comprises comparing the state of each of the indicators in a first time slice in the plurality of time slices with the state of the respective indicator in a second time slice in the plurality of time slices preceding the first time slice.

54. (new) The computer readable medium of claim 53, wherein the second time slice immediately precedes the first time slice.

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55. (new) The computer readable medium of claim 52, wherein the transition state for each indicator is a plurality of possible states including a low state and a high state, and wherein determining the transition state for the indicators in a first time slice in the plurality of time slices comprises determining which indicator or indicators changed state from low to high and which indicator or indicators changed state from high to low.

56. (new) The computer readable medium of claim 55, wherein determining the transition state is further based upon a number of indicators whose state changed from low to high and a number of indicators whose state changed from high to low.

57. (new) The computer readable medium of claim 56, wherein determining the transition state comprises identifying a maximum among the number of indicators whose state did not change, the number of indicators whose state changed from low to high, and the number of indicators whose state changed from high to low, and dividing the maximum by the number of indicators.

58. (new) The computer readable medium of claim 52, wherein the indicators are grouped into two or more groups of indicators, and wherein determining the transition state for each indicator comprises determining the transition state for each group based upon the numbers of indicators in each group whose state changed or did not change during each of the plurality of time slices.

59. (new) The computer readable medium of claim 52, wherein determining a transition state for each indicator comprises adjusting a first time slice to account for potential delays in determining states of each indicator.

60. (new) The computer readable medium of claim 59, wherein adjusting the first time slice to account for potential delays comprises:

Attorney Docket No. 3882/8
App. No. 09/815,557

determining which indicator, if any, changed state last in time during the first time slice;

determining whether any other indicators changed state during a predefined period preceding the time of last indicator state change; and

considering such other indicators whose state changed during the predefined period as having occurred during the first time slice.

61. (new) The computer readable medium of claim 52, comprising storing a transition relevance factor in association with each indicator representing whether the indicator is relevant, and wherein determining a transition state for each indicator comprises determining transition state changes only for relevant indicators.